MOBILE-BASED CNNS FOR PLANT LEAF DISEASE CLASSIFICATION AND PREDICTION

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Plants are affected by many diseases, which farmers find challenging to control. When these diseases are classified at an early stage, it will be easy for the farmers to detect the disease and control it with less expense. This research addresses the problem by introducing an adaptive mobile-based application, that enhances precision agriculture by classifying and predicting plant leaf diseases in real-time. The objective of this research is to develop a Convolutional Neural Network (CNN) based model that leverages image augmentation techniques and MobileNet architectures. This project develops a CNN model, using a dataset containing images of plant leaves from various crops such as potatoes, beans, corn, wheat and pepper. The research methodology encompasses data collection, image augmentation, training, and transfer learning, whereas fine-tuning is also employed to optimize the model's performance. The CNN model is deployed in a real-time mobile application developed using the Flutter framework, enabling users, particularly farmers to capture and analyse the plant leaf images on-site. Comparative analysis with other machine learning models including K-Nearest Neighbours, Naïve Bayes, Random Forest, Support Vector Machine, and Decision Tree highlights the superiority of the CNN model based on the evaluation metrics. Overall, this research empowers the advancement of precision agriculture and provides a dynamic solution by delivering a practical tool for plant leaf disease management in real time which offers a significant contribution to agricultural technology and sustainable farming practices.

***Keywords**: Machine learning, Mobile application, Real-time, Sustainable.*